# Post Graduate Diploma in Materials Management-3 years <br> Graduate Diploma in Materials Management <br> Paper No. 2 <br> QUANTITATIVE TECHNIQUES AND OPERATIONS RESEARCH 

Date: 22.12.2019
Time: 2.00 p,m. to 5.00 pm

## Instructions:

1. The Question Paper is in two parts- Part A (compulsory) and Part B.
2. From Part A answer all the questions. Each question carries 1 mark, total 25 marks. (Total Marks 25)
3. From Part B answer any five questions. .Each question carries 15 marks, total 75 marks.
4. Use of non-scientific calculator and/or mathematical tables is permitted. Graph paper can be used wherever necessary.

## PART A

## (Compulsory each sub question carries 1 mark)

## Q.1: State whether the following statements are true or false:

a. Quantitative Techniques do not offer powerful tools in the decision making process.
b. Analogues Models are Physical Models.
c. Customer arrives at the service system stays in the system until served is known as Patient Customer.
d. An imaginary activity which consumes resources and time is called dummy activity.
e Total Elapsed Time is indicated by " $T$ " Sequence Terminology.
f. Breakdown Maintenance is the periodical inspection to detect and prevent failures.
g. Capital Budgeting is one of the important decisions of the financial management of the enterprise.
h. On the basis of certain assumptions forecasting predicts the likelihood of economic activity.
i. Monte Carlo method is one of the probabilistic simulation models.
j. Inventory Turnover is equal to Annual Cost of goods sold divided by Average Inventory investment.
k. The EOQ model deals with ordering level of goods.
l. Barometric Technique is not a tool of forecasting.
m . Maximax or Minimin is a criteria Pessimism in decision analysis.
n . The model that solves the problem with multiple goals together is Goal Programming.
o. Operation Research is a scientific approach to problem solving for executive management.
Q. 2: Fill up the blanks:
(5 Marks)
a. Statistics are numerical
b. Three phases of Operation Research are Judgment phase Research phase and $\qquad$
c. Queuing Theory deals with problems that involve
d. Inventory is the stock of goods commodities or other resources that are stored for. $\qquad$
e. No Profit No Loss situation is $\qquad$
Q. 3. Expand the following:
(5 Marks)
a. LPP
b. LIFO
c. CPM
d. EMV
e. IRR

PART B
(Answer any five)
(5X15=75 Marks)
Q. 4: Write short notes on any three of the following: ( $3 \times 5=15$ Marks)
a. Characteristics of operation Research
b. Attitude of customers in Queuing Theory
c. Delphi Model
d. Aims of Capital Budgeting
e. Describe any three Terminologies of Game Theory
Q. 5: The Panasonic Company produces and sells a single product with the following costs and revenues for the year: (15 Marks)

| Particulars | Amount ( $\boldsymbol{\sim}$ ) |
| :--- | :--- |
| Total Revenues | $5,00,000$ |
| Total Fixed Costs | $1,00,000$ |
| Total Variable Costs | $2,00,000$ |
| Units Produced and Sold Units | $1,00,000$ |

a. What is the selling price per unit?
b. What is the variable cost per unit?
c. What is the contribution margin per unit?
d. What is the break-even point?
Q. 6: A company, for one of its class " $A$ " items, placed 8 orders each for a lot of 150 numbers in a year. Given that the ordering cost is $₹ 5,400.00$, the inventory holding cost is 40 percent, and the cost per unit is $₹ 40.00$. Find out if the company is making a loss in not using the EOQ Model for order quantity polices.

What are your recommendations for ordering the item in the future? And what should be the reorder level, if the lead time to deliver the item is 6 months
Q. 7: Describe about Forecasting, Forecasting Models and Tools of Forecasting
(15 Marks)
Q. 8: A company wants to introduce new products. Two products $A$ and $B$ are under the consideration of the company. Product A requires $₹ 35,000$ as investment towards R\&D. Product B requires $₹ 55,000$. Research conducted shows the high, low and medium demand for these products. The respective probabilities and return from sales are also given for both the products (15 Marks)

| Demand |  | Probability |  | Return from sales <br> $(₹ 000)$ |  |
| :--- | :---: | :---: | :---: | :---: | :---: |
|  | Product X | Product Y | Product X | Product Y |  |
| High | 0.3 | 0.2 | 70 | 90 |  |
| Medium | 0.3 | 0.4 | 50 | 80 |  |
| Low | 0.2 | 0.3 | 30 | 70 |  |

Construct a decision tree. What is the final decision of the company with respect to selection of a product for manufacturing?
Q. 9: a. A machine costs $₹ 500 /-$ to operate, while maintenance costs are zero for the first year, increasing by $₹ 100 /-$ every year. If the money is worth $5 \%$ every year, determine the best age at which the machine should be replaced (10 Marks)
b. Describe about replacement of items that fail suddenly. (5 marks)
Q.10: a. Draw a network for a house construction project. The sequence of activities with their predecessors is given in below Table: (10 marks)

Table 5.1

| Name of the <br> Activity | Starting and <br> finishing event | Description of activity | Predecessor | Time duration <br> (days) |
| :---: | :---: | :---: | :---: | :---: |
| A | $(1,2)$ | Prepare the house plan | -- | 4 |
| B | $(2,3)$ | Construct the house | A | 58 |
| C | $(3,4)$ | Fix the door/windows | B | 2 |
| D | $(4,5)$ | Wiring the house | B | 2 |
| E | $(4,6)$ | Paint the house | C | 1 |
| F | $(5,6)$ | Polish the doors/windows | D | 1 |

b. Write in brief about Project crashing.
(5 marks)

